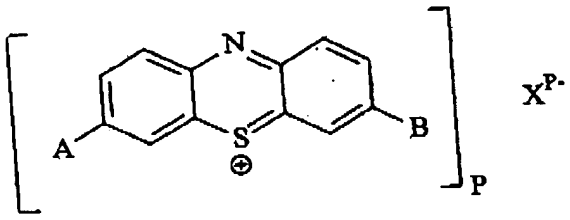
BROWN et al
Appl. No. 10/723,420
June 13, 2005

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-43 (Cancel).

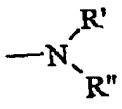
44. (New) A method of treatment that requires removal, deactivation or killing of unwanted tissues or cells comprising administering to a patient in need thereof an amount of a phenothiazinium compound of Formula (I):



(I)

wherein:

A and B each independently is



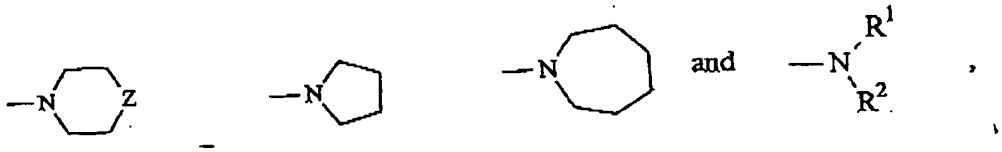
wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$,

wherein said compound of Formula (I) is administered in an amount sufficient to effect said treatment.

45. (New) The method according to claim 44 wherein, in the phenothiazinium compound of Formula (I), A and B are each independently selected from the group consisting of



wherein Z is selected from the group consisting of: CH_2, CH_2-C_{1-6}-alkyl, O, S, SO_2, NH, NCH_3, NC_2H_5, NCH_2CH_2OH, and $NCOCH_3$ and R^1 and R^2 are each independently linear or branched $C_nH_{2n}Y$, where n is 1-10, and Y is selected from the group consisting of: H, F, Cl, Br, I, -OH, $-OCH_3$, $-OC_2H_5$, $-OC_3H_7$, -CN and $-OCOCH_3$.

46. (New) The method according to Claim 44 wherein, in the compound of Formula (I), the counteranion is selected from the group consisting of: F^-, Br^-, Cl^-, I^-, NO_3^-, SCN^-, ClO_3^-, ClO_4^-, IO_3^-, BF_4^-, HSO_4^-, $H_2PO_4^-$, $CH_3SO_4^-$, N_3^-, SO_4^{2-}, HPO_4^{2-}, PO_4^{3-}, acetate, lactate, citrate, tartrate, glycolate, glycerate, glutamate, β-hydroxyglutamate, glucouronate, gluconate, malate and aspartate.

47. (New) The method according to Claim 44 wherein, in the compound of Formula (I), the counteranion is selected from the group consisting of: Cl^-, Br^-, I^-, F^-, NO_3^-, HSO_4^-, $CH_3CO_2^-$, a dianion, and a trianion.

48. (New) The method according to Claim 44 wherein, in the compound of Formula (I), A and B are the same or different and R^1 and R^2 are selected independently from the group consisting of: ethyl, n-propyl, n-butyl, i-butyl, n-pentyl, i-pentyl, n-hexyl, $HO(CH_2)_2$-, 2-ethylpiperidino, 2-methylpyrrolidino and cyclohexyl.

49. (New) The method according to Claim 44 wherein, in the compound of Formula (I), A and B are the same or different and R^1 and R^2 are selected independently from the group consisting of ethyl, n-propyl, n-butyl, i-butyl, n-pentyl, i-pentyl, n-hexyl, 2-ethylpiperidino, 2-methylpyrrolidino and cyclohexyl.

50. (New) The method according to Claim 44 wherein, in the compound of Formula (I), A and B are the same or different and R^1 and R^2 are selected independently from the group consisting of ethyl, n-butyl, i-butyl, n-pentyl, i-pentyl, n-hexyl, 2-ethylpiperidino, 2-methylpyrrolidino and cyclohexyl.

51. (New) The method according to Claim 44 wherein, in the compound of Formula (I), A and B are the same and both R^1 and R^2 are selected from the group consisting of n-propyl, n-butyl and n-pentyl.

52. (New) A method of treatment that requires removal, deactivation or killing of unwanted tissues or cells comprising administering to a subject in need thereof a moiety selected from the group consisting of:

3,7-(tetra-n-propylamino)-phenothiazin-5-ium;

3,7-(tetra-n-butylamino)-phenothiazin-5-ium;

3,7-(tetra-n-pentylamino)-phenothiazin-5-ium;

3,7-(tetra-iso-pentylamino)-phenothiazin-5-ium;

3-(N,N-di-n-butylamino)-7-(N,N-di-n-propylamino)-phenothiazin-5-ium;

3-(N,N-di-n-hexylamino)-7-(N, N-di-n-propylamino)-phenothiazin-5-ium;

3-(2-ethylpiperidino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium;

3-(2-methylpyrrolidino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium;

3,7-(N, N-tetra- iso-butylamino)-phenothiazin-5-ium;

3-(N, N-di-n-butylamino)-7-(N, N-di-iso-pentylamino)-phenothiazin-5-ium;

3-(N,N-diethanolamino)-7-(N, N-di-n-pentyiamino)-phenothiazin-5-ium;

3-(N,N-diethylamino)-7-(N, N-di-n-propylamino)-phenothiazin-5-ium;

3-(N, N-di-n-pentylamino)-7-(N, N-di-n-propylamino)-phenothiazin-5-ium

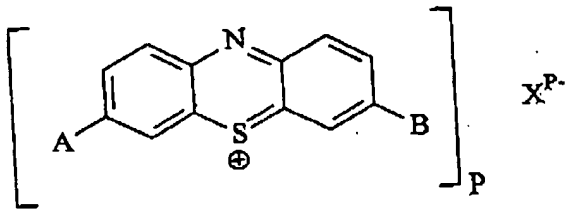
3-(N, N-di-n-butylamino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium; and

3-((N-ethyl-N-cyclohexyl) amino)-7((-N-ethyl)-N-cyclohexyl) amino-phenothiazin-5-ium;

wherein the counteranion is selected from the group consisting of Cl^-, Br^- and I^-, and

wherein said moiety is administered in an amount sufficient to effect said treatment.

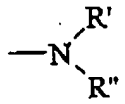
53. (New) A composition comprising one or more compounds of Formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$;

and a diluent or excipient.

54. (New) A compound as defined in claim 44 for use as a medicament.

55. (New) A compound as defined in claim 44 for use as an anticancer agent, an antibacterial or an antifungal or an antiviral.

56. (New) A compound as defined in claim 44 for use against microorganisms.

57. (New) A compound as defined in claim 44 for use against bacteria.

58. (New) A compound as defined in claim 44 for use against antibiotic resistant bacteria.

59. (New) A compound as defined in claim 44 for use as a PDT agent or a photodiagnostic agent.

60. (New) A compound as defined in claim 44 for use as an anti-microbial treatment for skin and other local infections, for sterilization of burn wounds and other lesions, and for the treatment of dental bacterial disease.

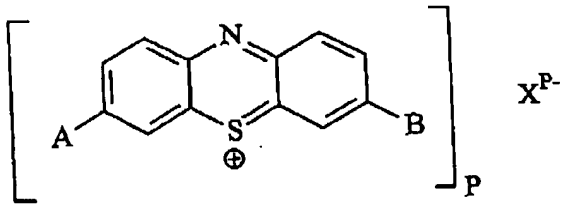
61. (New) A compound as defined in claim 44 for use in the treatment of pre-cancerous conditions, cancer, ophthalmological disease including macular degeneration, vascular problems, arteriosclerosis, restenosis, autoimmune diseases, skin diseases and other benign conditions.

62. (New) A compound as defined in claim 44 for use as a photoactivated antimicrobial agent for sterilization of surfaces and fluids.

63. (New) A compound as defined in claim 44 for use in photochemical internalization.

64. (New) A compound as defined in claim 44 for photodetection and/or photodiagnosis.

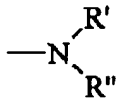
65. (New) A conjugate or composite formed between a compound of formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring,

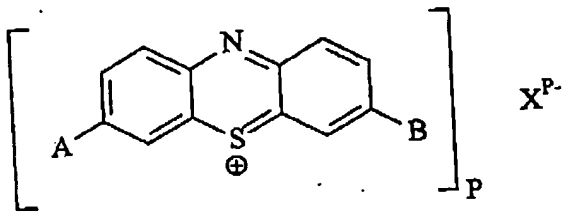
and wherein X^{P-} is a counteranion and P is 1, 2 or 3,

except for the compounds in which A and B are both either —$N(CH_3)_2$ or -$N(CH_2CH_3)_2$,

and a polymer.

66. (New) The conjugate or composite of claim 65 wherein said polymer includes anhydride and/or ester groups.

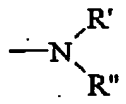
67. (New) A compound formed by the reaction between a compound Formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring,

and wherein X^{P-} is a counteranion and P is 1, 2 or 3,

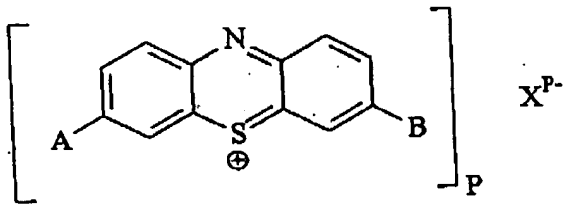
except for the compounds in which A and B are both either —$N(CH_3)_2$ or -$N(CH_2CH_3)_2$, and a chlorotriazine derivative.

68. (New) A compound according to claim 67 wherein the chlorotriazine derivative is a polymer having chlorotriazine groups attached thereto.

69. (New) The conjugate or composite according to claim 65 further comprising a diluent or excipient.

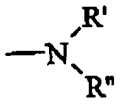
70. (New) A method of treating pre-cancerous conditions, cancer, ophthalmological disease, vascular problems, arteriosclerosis, restenosis, autoimmune diseases, skin diseases and other benign conditions, the method comprising:

administering to a subject in need thereof a therapeutically effective amount of a compound of Formula (I):



wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$; and exposing said subject to light to render active said compound.

71. (New) The method according to claim 70 wherein said compound is administered and the light exposure is given up to 48 hours after a drug is initially administered.

72. (New) The method according to claim 70 wherein said compound is administered and the light exposure is given up to 3 hours after a drug is initially administered.

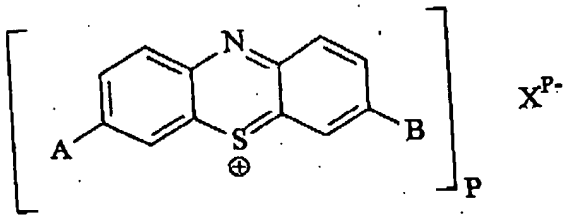
73. (New) The method according to claim 70 wherein R^1 and R^2 are both n-propyl and said light exposure is given up to 10 minutes after a drug is initially administered.

74. (New) The method according to claim 71 wherein light exposure is given within 1 minute after a drug is initially administered.

75. (New) The method according to claim 71 wherein light exposure is given at the point of drug administration.

76. (New) The method according to claim 70 wherein R^1 and R^2 are both n-pentyl and said light exposure is given up to one hour after a drug is initially administered.

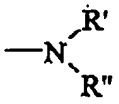
77. (New) A method of treatment of microbial infections, burn wounds and other lesions and dental bacterial disease, the method comprising administering to a subject in need thereof, by systemic administration or by application to the area to be treated, a therapeutically effective amount of a compound of Formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

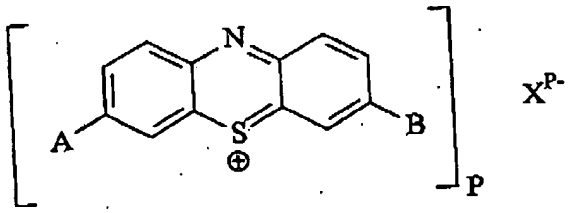
except for the compounds in which A and B are both either —$N(CH_3)_2$ or -$N(CH_2CH_3)_2$;

and exposing said area to light to render active said compound.

78. (New) The method according to claim 77 where R^1 and are n-butyl.

79. (New) A method of sterilizing a surface or a fluid comprising:

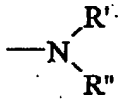
contacting or applying a compound of the Formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

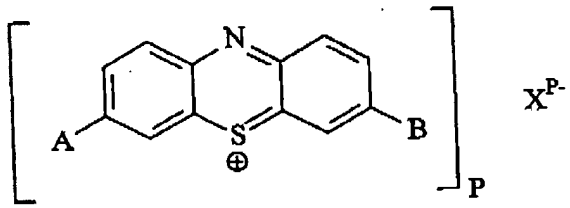
and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$;

to said surface or fluid; and

activating said compound by means of light.

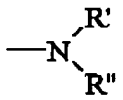
80. (New) An article having at least one surface to which is attached a compound, conjugate or composite comprising a compound of Formula (I):



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$.

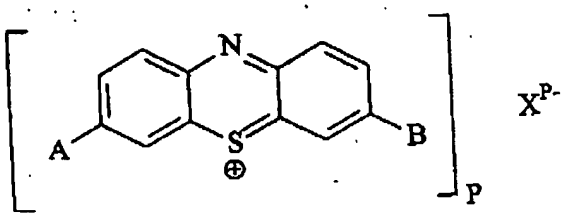
81. (New) The article according to claim 80 wherein attachment is by covalent bonds or by intermolecular interactions.

82. (New) The article according to claim 80 wherein said article is a medical device.

83. (New) The article according to claim 80 wherein said article is for use in the food industry.

84. (New) A method for sterilizing fluids comprising contacting the fluid with a conjugate or composite formed between:

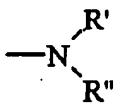
a compound of Formula (I):



(I)

wherein:

A and B each independently is

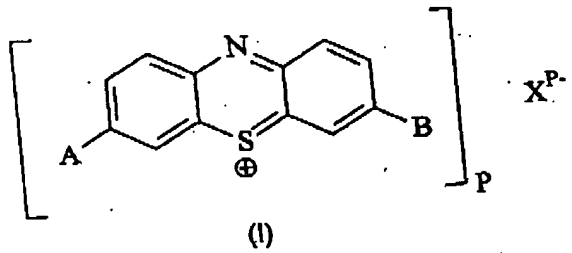


wherein R' and R" each independently is an optionally substituted linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring,

and wherein X^{P-} is a counteranion and P is 1, 2 or 3,

except for the compounds in which A and B are both either $-N(CH_3)_2$ or $-N(CH_2CH_3)_2$, and a polymer while the conjugate or composite is illuminated.

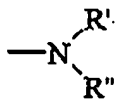
85. (New) A compound of Formula (I)



(I)

wherein:

A and B each independently is



wherein R' and R" each independently is a linear, branched or cyclic hydrocarbon group, or R' and R" together with the N atom to which they are attached form an optionally substituted 5-, 6- or 7-membered ring;

and wherein X^{P-} is a counteranion and P is 1, 2 or 3;

except for the compounds in which A and B are the same and are selected from the group consisting of $-N(CH_3)_2$, $-N(CH_2CH_3)_2$, $N(n\text{-}Pr)_2$, $-N(n\text{-}Bu)_2$, $-N(n\text{-}Pent)_2$, $-N(n\text{-}Hex)_2$, $-N(n\text{-}Hept)_2$, piperidino, $-N(CH_2CH_2OH)_2$, and -N(diethylhexyl)$_2$,

and not including those in which A is selected from $-N(Me)_2$ or $-N(Et)_2$ and B is selected from the group consisting of: $-N(CH_2CH_2OH)_2$, piperidino, morpholino, thiomorpholino, $-N(Et)_2$, -N(MeEt), and $-N(Me)_2$.

86. (New) The compound according to claim 85 wherein

said compound consists of a moiety selected from the group consisting of:

3,7-(tetra-iso-pentylamino)-phenothiazin-5-ium

3-(N, N-di-n-butylamino)-7-(N,N-di-n-propylamino)-phenothiazin-5-ium;

3-(N,N-di-n-hexylamino)-7-(N,N-di-n-propylamino)-phenothiazin-5-ium;

3-(2-ethylpiperidino)-7-(N,N-di-n-pentylamino)-phenothiazin-5-ium;

3-(2-methylpyrrolidino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium;

3,7-(N,N-tetra- iso-butylamino)-phenothiazin-5-ium;

3-(N, N-di-n-butylamino)-7-(N, N-di-iso-pentylamino)-phenothiazin-5-ium;

3-(N, N-diethanolamino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium;

3-(N, N-diethylamino)-7-(N, N-di-n-propylamino)-phenothiazin-5-ium;

3-(N, N-di-n-pentylamino)-7-(N, N-di-n-propylamino)-phenothiazin-5-ium;

3-(N, N-di-n-butylamino)-7-(N, N-di-n-pentylamino)-phenothiazin-5-ium; and

3-((N-ethyl-N-cyclohexyl)amino)-7((-N-ethyl)-N-cyclohexyl)amino-phenothiazin-5-ium;

in which the counteranions are selected from the group consisting of: Cl^-, Br^- and I^-.